SEVENTY-FIRST MEETING

OF

The Electrochemical Society, Inc.

PHILADELPHIA, PENNSYLVANIA

April 28, 29, 30 and May 1, 1937

LOCAL COMMITTEES

Chairman
Hiram S. Lukens

Budget and Finance
George A. Perley, *Chairman*
Guilliam H. Clamer — Clarence A. Hall
Arthur E. Gibbs — Russell P. Heuer

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Industrial Trips
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Publicity Committee
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Edward B. Sanigar, *Chairman*
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Committee on Meetings
A. Kenneth Graham, *Chairman*
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Mrs. Harry A. Alsentzer, Jr.
Mrs. Newcomb K. Chaney
Mrs. H. Jermain Creighton
Mrs. A. Kenneth Graham
Mrs. Russell P. Heuer
Mrs. George A. Perley

Seventy-first Meeting

GENERAL INFORMATION

Hotel Information

Headquarters and Registration Desk will be at the Hotel Benjamin Franklin, Second Floor, Foyer, Crystal Ball Room. It is recommended that members write at once for reservations. The rates at the Benjamin Franklin are $3.50 per day (single rooms), and $5.00 per day (double rooms with double bed or twin beds). For rates at other hotels, see the last page of this program.

Registration will begin at 7:30 p.m. in the Foyer of the Crystal Ball Room of the Benjamin Franklin Hotel, on Wednesday, April 28th. The registrar will receive arriving members and guests, distribute badges and programs, and give detailed information.

Guests should be introduced by members and when registered, they may attend the sessions and receive

such other courtesies as may be extended to them by the Local Committee or the Officers of the Society. Local members of other scientific societies, such as the American Chemical Society, the American Institute of Chemical Engineers, the American Institute of Chemists, the American Institute of Electrical Engineers, the Franklin Institute, the Engineers Club, the American Philosophical Society, and the American Society of Mechanical Engineers, are invited to register as guests without introduction.

The registration fee is $2.00 per member or guest registering. This fee also applies to ladies. The low registration fee is made possible through the generosity of local members.

Places of Meetings

The scientific and technical sessions will be held in the Crystal Ball Room on the Second Floor of the Benjamin Franklin Hotel.

Luncheons will be served in the Crystal Ball Room of the Benjamin Franklin Hotel on Thursday, Friday and Saturday.

The dinner dance ($2.50 per person) will be held in the Crystal Ball Room of the Benjamin Franklin Hotel on Friday, April 30th, preceded by a reception to the retiring and the incoming presidents in the Betsy Ross Room at 7:00 p.m. The nationally famous "Ray Steen's Orchestra" will provide the dance music.

Thursday Evening

On Thursday evening, April 29th, **Dr. Detlev W. Bronk,** internationally known for his researches in physiology and physics, will address the members and guests on **"Electrical Methods in the Study of Nerve and Muscle,"** in the Crystal Ball Room of the Benjamin Franklin Hotel. Dr. Bronk is distinguished by his work on infra-red spectroscopy; electrical properties of glands; volume flow of blood; and physiology of sense organs, and of the nervous system. Dr. Bronk has been the Johnson Professor of Biophysics and Director of the Johnson Foundation at the University of Pennsylvania since 1929.

Following the lecture by Dr. Bronk, a reception and informal supper dance

will be held in the Georgian Room, First Floor of the Benjamin Franklin Hotel. Admission will be by complimentary ticket received at time of registration. Extra tickets may be obtained at $1.25 each. There will be dancing until 1 a.m., and bridge for those who wish it.

Friday Evening Presidential Address

The annual dinner-dance of the Society is scheduled for Friday evening, April 30th, in the Crystal Ball Room. Preceding the dinner, there will be a reception to the retiring and the incoming presidents in the Betsy Ross Room at 7 p.m. Immediately following the dinner, retiring **President Duncan A. MacInnes** will deliver his address, **"The Contribution of Willard Gibbs to Electrochemistry."**

William A. Johnson Receives the 1936 Prize to Young Authors

The 1936 Prize to Young Authors goes to William A. Johnson, of Pittsburgh. The Society's Committee of Awards voted Mr. Johnson the most worthy recipient of the 1936 Prize for

his paper (jointly with Professor Allison Butts) on "Studies of Overvoltage: The Effect of Fusion of the Cathode and the Effect of Temperature on Gas Polarization." The paper was presented at the Niagara Falls Meeting in the Fall of 1936.

Mr. Johnson was born in Washington, D. C., on November 9, 1913. He attended the public schools there, and upon graduation from high school in 1931, entered Lehigh University, from which he received the degree of Bachelor of Science in Metallurgical Engineering in 1935. The following year was spent at Lehigh as a teaching fellow in mathematics. At present, Mr. Johnson holds the Molybdenum Corporation of America Fellowship in Metallurgy at the Carnegie Institute of Technology, where he is investigating the heat treatment characteristics of tungsten steels, and from which Institute he hopes to receive the degree of Doctor of Science in Metallurgy sometime in the future.

Following the dinner and award of prizes, there will be dancing in the Crystal Ball Room.

Electrodeposition Division

At the suggestion of a number of the members of the Electrodeposition Division, the Division will hold a special dinner meeting to discuss future policies of the Division. The meeting will be held at 6:00 p.m. on Thursday, April 29th, in El Patio Grill, Basement of the Benjamin Franklin Hotel. Service is a la carte at a nominal cost. All who are interested are urged to attend.

Industrial Trips

All day Friday will be devoted to the inspection of local plants of interest to electrochemists. On Friday morning at 9:00 o'clock, buses will leave from the Sansom Street Entrance on the south side of the Benjamin Franklin Hotel, taking members and guests to the plant of the **Edward G. Budd Manufacturing Company,** where an opportunity will be afforded to see a demonstration of the processing of stainless steel sheets for the construction of railroad rolling stock, including rolling, shaping stock, routing jigs and side assembly jigs. Testing for water tightness will be demonstrated in a water spray shop.

From the Budd plant, the party will proceed by buses to the **Leeds and Northrup Company** where various manufacturing processes employed for the Leeds and Northrup products will be demonstrated, as well as the application of a number of newly developed devices.

At the conclusion of this visit, members and guests will return by bus to the Benjamin Franklin Hotel where the Leeds and Northrup Company will entertain them at luncheon.

Following the luncheon, the party will proceed to the **Franklin Institute,** and buses for this trip will leave from the Hotel at 2:00 p.m. There members and guests will visit the planetarium for a special demonstration and inspect the museum before returning to the Hotel for the formal dinner-dance.

Ladies wishing to join men on plant trips are welcome to do so.

For visits to plants other than those on the program, consult Mr. A. D. Spillman, who may be reached through the registration desk.

Admission to Sessions and Social Functions

Tickets must be obtained at registration desk for all scheduled meals and other functions. The Society badge received upon registration is absolutely essential for admission to the Technical and Scientific Sessions.

Buses will be available for plant trips and sightseeing only to those registrants holding proper tickets.

Cost of Functions

	Ladies	Men
Registration	$2.00	$2.00
Thursday luncheon	complimentary	1.25
Friday dinner-dance	2.50	2.50
Saturday luncheon	1.25	1.25
Total	$5.75	$7.00

The Ladies' luncheon on Thursday, the luncheon for both men and women on Friday, transportation to plants, etc., and the public lecture and informal supper dancing after Dr. Bronk's lecture on Thursday evening are complimentary. Extra tickets for the supper dance Thursday for those not registered, $1.25.

Golf

Those wishing to play golf will advise Dr. A. Kenneth Graham through the registration desk, where guest cards may be obtained for the Roxborough Country Club and the York Road Country Club.

LADIES' PROGRAM

Wednesday, April 28, 1937

7:30-9:00 p.m. Registration, Foyer, Crystal Ball Room, Hotel Benjamin Franklin. ($2)

Thursday, April 29, 1937

10:00 a.m. Members of the local Ladies' Committee will greet visiting ladies in the Foyer of the Crystal Ball Room, Second Floor, Benjamin Franklin Hotel.

10:30 a.m. Buses will leave Sansom Street Entrance of the Hotel for trip to Colonial homes in Fairmount Park.

1:00 p.m. Luncheon at Green Hill Farms Hotel. (Complimentary).

2:30 p.m. Buses leave Green Hill Farms Hotel for Valley Forge Park and return to Hotel Benjamin Franklin.

8:00 p.m. Lecture by Dr. Detlev W. Bronk on **"Electrical Methods in the Study of Nerve and Muscle,"** Crystal Ball Room, Benjamin Franklin Hotel.

9:30 p.m. Reception and informal supper dance. Georgian Room, First Floor, Benjamin Franklin Hotel. (Complimentary).

Friday, April 30, 1937

Morning open for shopping.

12:00 noon. Luncheon, Crystal Ball Room, Benjamin Franklin Hotel. (Compliments of the Leeds and Northrup Company).

2:00 p.m. Buses leave Sansom Street Entrance for the Franklin Institute.

7:00 p.m. Reception to retiring and incoming presidents, Betsy Ross Room, Second Floor, Benjamin Franklin Hotel.

7:30 p.m. Dinner - dance ($2.50), Crystal Ball Room, Benjamin Franklin Hotel. Presidential Address. Award of Prizes.

Saturday, May 1, 1937

10:00 a.m. Buses leave Sansom Street Entrance for visit to the Pennsylvania Museum of Art.

12:00 noon. Luncheon. Crystal Ball Room, Benjamin Franklin Hotel. ($1.25).

2:30 p.m. Informal parties.

NOTES

DETAILED PROGRAM

Wednesday, April 28, 1937

7:30 to 9:00 p.m. Registration at the Benjamin Franklin in the Foyer, Crystal Ball Room, Second Floor.

NOTE: Local members and guests are requested to register as early as possible.

8:30 p.m. Meeting of the Board of Directors followed by the annual business meeting, open to all members. Report of Tellers of Election on new officers of the Society. Room 244, Benjamin Franklin Hotel.

Thursday, April 29, 1937

7:45 a.m. Group breakfasts.

8:15 a.m. Registration, 2nd Floor, Foyer, Crystal Ball Room, Benjamin Franklin Hotel.

8:45 a.m. Scientific-Technical Session on **"Electrochemical Methods in Biology,"** Duncan A. MacInnes, Rockefeller Institute for Medical Research, presiding. Crystal Ball Room.

(12) "Some Recent Developments in Electrokinetic Methods and Their Application to Biology and Medicine," by H. A. Abramson and L. S. Moyer, Columbia University, New York City, and University of Minnesota, Minneapolis, respectively.

Abramson
Moyer

(9) "Electrochemical Methods in the Study of Plant Cells," W. J. V. Osterhout, Rockefeller Institute for Medical Research, New York City.

Osterhout

(17) "Review of the Semiquinone Problem," by L. Michaelis, Rockefeller Institute for Medical Research, New York City.

Michaelis

(24) "Recent Advances in the Chemistry of the Proteins," by Edwin J. Cohn, Harvard Medical School, Cambridge, Mass.

Cohn

(14) "The Measurement and Regulation of pH with the Glass Electrode," by D. A. MacInnes and L. G. Longsworth, Rockefeller Institute for Medical Research, New York City.

MacInnes
Longsworth

Ferguson
Hitchens
Van Lente

(28) "The Constancy of Static Liquid Junction Potentials in Complex Systems and Their Application to the Titration of Weak Bases," by A. L. Ferguson, R. Hitchens, and K. Van Lente, University of Michigan, Ann Arbor.

Muller
Baumberger

(34) "The Use of the Dropping Mercury Electrode as Indicator Electrode for the Determination of Oxidation-Reduction Potential," by O. H. Muller and J. P. Baumberger, Stanford University, California.

Muller
Baumberger

(35) "Polarographic Determination of Oxidation-Reduction Potential Using the Dropping Mercury Electrode," by O. H. Muller and J. P. Baumberger, Stanford University, California.

12:00 noon. Luncheon under direction of the Officers of the **Electrothermic Division,** Lyman C. Judson and H. M. St. John, Crystal Ball Room, Second Floor, Hotel Benjamin Franklin. Tickets at Registration Desk, $1.25. At this luncheon meeting, the new Officers of the Division will be announced,

and there will be short impromptu talks by prominent electrothermists. Guest speaker, Charles H. Herty, Jr., Bethlehem Steel Co.

2:00 p.m. Scientific-Technical Session on **"Electrode Phenomena in Aqueous Solutions,"** William Blum, National Bureau of Standards, presiding, Crystal Ball Room.

Bancroft (7) "Anode Reactions," by Wilder D. Bancroft, Cornell University, Ithaca, New York.

Chittum Hunt (10) "Electrokinetic Potential at Metal Surfaces," by J. F. Chittum and H. Hunt, Purdue University, Lafayette, Indiana.

Kersten Young (4) "A Study of Electrodeposits Containing Nickel and Sulfur," by H. Kersten and W. T. Young, University of Cincinnati, Ohio.

Cymboliste Salauze (16) "Blister Pits in Electrodeposits," by M. Cymboliste and J. Salauze, Laboratoires des Usines d'automobiles Chenard et Walcker, Neuilly, France.

(21) "Alkaline Plating Baths Containing the Ethanolamines. V. Copper Plating from Diethanola-

mine Solutions," by C. J. Brockman and J. B. Whitley, University of Georgia, Athens, and Georgia Military College, Milledgeville, respectively.

(22) "Alkaline Plating Baths Containing Organic Amines. I. Copper Plating from Solutions Containing Diethylenetriamine," by C. J. Brockman, University of Georgia, Athens.

(2) "Heavy Nickel and Chromium Deposition in England," by C. F. Bonilla, College of the City of New York.

(1) "The Electrodeposition of Manganese from Aqueous Solutions," by W. E. Bradt and H. H. Oaks, University of Maine, Orono, and State College of Washington, Pullman, respectively.

(5) "Electrodeposition of Manganese Using Insoluble Anodes," by Colin G. Fink and M. Kolodney, Columbia University, New York City.

(30) "Metals Codeposited with Tungsten from the Alkaline Tung-

Holt

sten Plating Bath," by M. Leslie Holt, University of Wisconsin, Madison.

6:00 p.m. Informal group dinner parties.

NOTE: All members interested in the **Electrodeposition Division** are cordially invited to meet the Officers of that Division in El Patio Grill, in the Basement of the Benjamin Franklin Hotel, at 6:00 p.m., to discuss the future program and policies of the Division. Service in the grill is a la carte at nominal cost.

8:00 p.m. Lecture by Dr. Detlev W. Bronk on **"Electrical Methods in the Study of Nerve and Muscle,"** Crystal Ball Room, Benjamin Franklin Hotel.

9:30 p.m. Reception and Informal Supper Dance. Georgian Room, First Floor, Benjamin Franklin Hotel. (Compliments of the Local Section Officers). Bridge parties will be arranged for those who wish to play.

Friday, April 30, 1937

9:00 a.m. Buses leave Sansom Street Entrance on the south side of the Benjamin Franklin Hotel for visits to the plants of the Edward G. Budd Manufacturing Company and the Leeds and Northrup Company.

12:00 noon. Luncheon, Crystal Ball Room, Hotel Benjamin Franklin. Compliments of the Leeds and Northrup Company.

2:00 p.m. Buses leave Sansom Street Entrance for visit to the Franklin Institute where the Museum will be open for inspection and where there will be a special demonstration in the Planetarium.

7:00 p.m. Reception to retiring and incoming presidents in the Betsy Ross Room, Second Floor, Hotel Benjamin Franklin.

7:30 p.m. Annual dinner ($2.50), Crystal Ball Room, Hotel Benjamin Franklin. Presidential Address, Award of honors and prizes.

10:00 p.m. Dancing in the Crystal Ball Room.

Saturday, May 1, 1937

8:00 a.m. Group breakfasts.

9:00 a.m. Scientific-Technical Session on **"Industrial Catalysis,"** Edward L. Kropa, American Cyanamid Company, presiding. Crystal Ball Room.

Frolich

(20) "The Use of Metallic Oxides as Catalysts in Certain Organic Chemical Processes," by Per K. Frolich, Standard Oil Development Company, Elizabeth, New Jersey.

V.N. Ipatieff

(27) "True and Conjunct Catalytic Polymerization of Olefins," by V. N. Ipatieff, Universal Oil Products Co., Riverside, Illinois.

Larson

(19) "Some Observations on Ammonia and Methanol Catalysts," by Alfred T. Larson, E. I. duPont de Nemours & Company, Wilmington, Delaware.

Bodenstein

(25) "The Mechanism of the Catalytic Combustion of Ammonia," by Max Bodenstein, Berlin, Germany.

Taylor

(13) "Catalytic Reactions among Complex Molecules," by H. S. Taylor, Princeton University, New Jersey.

Emmett Brunauer

(18) "The Use of Adsorption Isotherms for Measuring the Surface Areas of Catalysts and Other Finely Divided Materials," by P. H. Emmett and S. Brunauer, Bureau of Chemistry and Soils, U. S. Department of Agriculture, Washington, D. C.

Hopkins Taebel

(6) "The Rare Earths as Catalysts," by B. S. Hopkins and W. A. Taebel, University of Illinois, Urbana.

Schumacher

(26) "Halogens as Catalysts," by Hans J. Schumacher, University of Frankfurt, Germany.

Fraser

(33) "Nickel as a Catalyst," by O. B. J. Fraser, International Nickel Company, New York City.

Fink

(5) "Cobalt as a Catalyst," by Colin G. Fink, Columbia University, New York City.

12:00 noon. Luncheon, Crystal Ball Room, Benjamin Franklin Hotel, under the direction of the Officers

of the **Electronic Division,** J. W. Marden and Marlin E. Fogle. Speaker: **Dr. H. C. Rentschler,** Westinghouse Lamp Company. Topic, **"Photo Cells."** Luncheon tickets at Registration Desk, $1.25.

2:00 p.m. Scientific-Technical Session on **"Organic Electrochemistry and Miscellaneous Papers,"** H. Jermain Creighton, Swarthmore College, presiding. Crystal Ball Room.

Lowy Phillips

(8) "The Electrolytic Reduction of Trinitro Aromatic Compounds to Their Respective Triamines," by Alexander Lowy and J. Phillips, University of Pittsburgh, Pennsylvania.

Bradt Fallscheer

(15) "The Electrochemical Oxidation of Copper Lactate," by W. E. Bradt and H. O. Fallscheer, University of Maine, Orono, and State College of Washington, Pullman, respectively.

Peters

(29) "Thermionic Vacuum Tube Electrode Materials," by Fred P. Peters, Metals and Alloys, New York City.

Moore Smith

(23) "The Occlusion and Diffusion of Hydrogen in Metals," by G. A. Moore and D. P. Smith, Princeton University, New Jersey.

Stender Jornitsky Sabo

(11) "Acid-Proof Diaphragms," by W. W. Stender, J. G. Jornitsky, and B. G. Sabo, State Institute for Applied Chemistry, Leningrad, U. S. S. R.

Hatfield Harner

(31) "Storage Battery Life Tests. I. Laboratory Life Testing," by J. E. Hatfield and H. R. Harner, Eagle-Picher Lead Company, Joplin, Missouri.

Hatfield Harner

(32) "Storage Battery Life Tests. II. Service Life Testing," by J. E. Hatfield and H. R. Harner, Eagle-Picher Lead Company, Joplin, Missouri.

6:00 p.m. Adjournment.

NOTES

The Philadelphia Volume

The inclusion of the title of a paper in this program does not necessarily imply publication of that paper in the "Philadelphia Volume" of the Electrochemical Society's Transactions.

Typewritten Discussion

Members wishing to present written discussion on any of the papers listed in this program will please submit three copies of each to Dr. Colin G. Fink, Secretary of the Society, whose office is at Columbia University, New York City.

Acknowledgment

The Board of Directors of the Electrochemical Society gratefully acknowledges the splendid cooperation and generous financial assistance of the friends of the Society in Philadelphia who have been largely responsible for this interesting and enjoyable program.

FALL MEETING

October 13, 14, 15, and 16, 1937

St. Louis, Missouri

Headquarters:

HOTEL CHASE

The Two Main Sessions of this Meeting will be devoted to

pH DETERMINATION AND PROCESS CONTROL

and

RECTIFIERS AND D.C. TRANSMISSION

Manuscripts for the Fall Meeting are due at the Secretary's Office not later than July 15th, 1937.

SOCIETY MEMBERSHIP

Entrance Fee $5.00. (Students are exempt from paying entrance fee.) Yearly Dues $10.00. Application blanks and any other information may be obtained from the Secretary. Each member receives the publications of the Society, in pamphlet form, comprising the papers and discussions of the General Meetings of the Society. Members can obtain the two bound volumes of the Transactions for an extra payment of $3.00 per year.

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SOCIETY PIN OR KEY $3.00

The Society pin, 10 k. gold, as illustrated above, actual size, shows a circular shield with details in design. Every member should wear this insignia of the Society.

NOTES

HOTELS LOCATED NEAR HEADQUARTERS

	Per Day	
	Single	Double
The Bellevue-Stratford (Broad and Walnut Sts.)	$3.50 up	$5.00 up
Broadwood Hotel (Broad St. at Wood)	$2.00 up	$4.00 up
Green Hill Farms (City Line and Lancaster Ave.)	$3.50 up	$5.00 up
Hotel Normandie (36th and Chestnut Sts.)	$2.50 up	$3.50 up
Penn Athletic Club (Men only)	$2.50	
Hotel Philadelphian (39th and Chestnut Sts.)	$2.50 up	$4.00 up
Hotel Sylvania (Locust at Juniper Sts.)	$3.00 up	$3.50 up
The Warwick (Locust St. at 17th)	$3.50 up	$5.50 up

LOCAL SECTIONS OF THE SOCIETY

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J. L. Crenshaw, V.-Chairman, Langhorne, Pa.
E. B. Sanigar, Secy., West Philadelphia, Pa.
W. B. Keighton, Jr., Treas., Swarthmore, Pa.

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Past President

James H. Critchett, Union Carbide & Carbon Research Labs., Inc., New York City.

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Colin G. Fink, Columbia University, New York City.

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Leon R. Westbrook, Vice-Chairman
Gustaf Soderberg, Secretary-Treasurer

Electronics Division

J. W. Marden, Chairman
Ralph L. Seabury, Vice-Chairman
Marlin E. Fogle, Secretary-Treasurer

Electrothermic Division

Lyman C. Judson, Chairman
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